ADA Undercounter Refrigerator Service Manual

Scientific Series™

Model Group	Scientific Series
Laboratory/Pharmacy	SLR104-ADA (Version A)

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360164-A/C

ISO 13485:2003 CERTIFIED

Document History

Revision	Date	CO	Supersession	Revision Description
A	11 FEB 2013	8268	n/a	Initial release.
B	21 MAR 2013	8338	B supersedes A	► Corrected hysteresis value and refrigerant charge value. ► Corrected part numbers for compressor, and unit cooler.
C	20 JUN 2014*	8490	C supersedes B	► Revised layout for ease of navigation and locating information. ► Changed setpoint value, as per CO 8490. ► Removed CE 0086 certification.

* Date submitted for Change Order review. Actual release date may vary.

Contents

Section I: General Information

1 About this Manual

1.1 Intended Audience

This manual is intended for use by end users of the refrigerator and authorized service technicians.

1.2 Model References

Generic references are used throughout this manual to group models that contain similar features. For example, “104 models” refers to all models of that size (SLR104-ADA). This manual covers all SLR undercounter refrigerators, which may be identified singly, by its size, or by its respective “Series.”

1.3 Copyright and Trademark

Helmer, Inc., doing business as (DBA) Helmer Scientific and Helmer.

2 Safety

The operator or technician performing maintenance or service on Helmer Scientific products must (a) inspect the product for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the product, or the safe operation of the product, and (c) fully inspect and test the product to ensure the maintenance or service has been performed properly.

2.1 Safety Definitions

The following general safety alerts appear with all safety statements within this manual. Read and abide by the safety statement that accompanies the safety alert symbol.

WARNING The safety statement that follows this safety alert symbol indicates a hazardous situation which, if not avoided, could result in serious injury.

CAUTION The safety statement that follows this safety alert symbol indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE The safety statement that follows this safety alert symbol indicates a situation which, if not avoided, could result in damage to the product or stored inventory.

2.2 Product Labels

Caution: Risk of damage to equipment or danger to operator

Caution: Hot surface

Caution: Shock/electrical hazard

Caution: Unlock all casters

Earth / ground terminal

Protective earth / ground terminal

2.3 Avoiding Injury

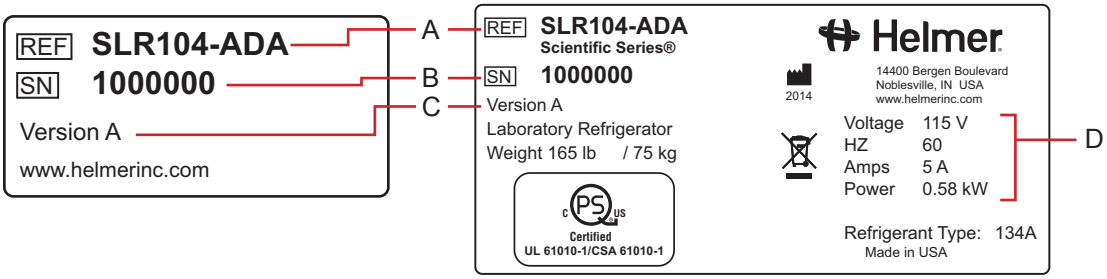
- ► Review safety instructions before installing, using, or maintaining the equipment.
- ► Before moving unit, ensure door is closed and casters (if installed) are unlocked and free of debris.
- ► Before moving unit, disconnect the AC power cord and secure the cord.
- ► Never physically restrict any moving component.
- ► Avoid removing electrical service panels and access panels unless so instructed.
- ► Keep hands away from pinch points when closing the door.
- ► Avoid sharp edges when working inside the electrical compartment and refrigeration compartment.
- ► Ensure biological materials are stored at recommended temperatures determined by standards, literature, or good laboratory practices.
- ► Proceed with caution when adding and removing samples from the refrigerator.
- ► Use supplied power cord only.
- ► Using the equipment in a manner not specified by Helmer Scientific may impair the protection provided by the equipment.
- ► Decontaminate parts prior to sending for service or repair. Contact Helmer Scientific or your distributor for decontamination instructions and a Return Authorization Number.
- ► Ensure biological materials are stored safely, in accordance with all applicable organizational, regulatory, and legal requirements.
- ► The refrigerator is not considered to be a storage cabinet for flammable or hazardous materials.

3 Configuration

3.1 Model and Input Power

NOTE Service information varies depending on the model and power requirements.

This information appears on the product specification label, located on the rear of the refrigerator. The model also appears on a label located in the chamber on the upper side of the right wall.



Left: Chamber label. Right: Product specification label (located on the rear at lower left).

Label	Description
A	Model (REF)
B	Serial number (SN)
C	Version
D	Power requirements

3.2 Scientific Series Control System

Scientific Series refrigerators feature the SLR combined monitor and temperature controller. The Scientific Series monitoring and control system controls chamber temperature and displays operational information.

Temperature monitor and controller.

3.3 Temperature Probe

NOTE The probe bottle kit is an optional accessory, and is required if the optional chart recorder is installed.

External probes may be introduced through existing rear port and immersed in the optional probe bottle.

For the probe bottle, use:

► Approximately 4 oz. (120 mL) of product simulation solution (10:1 ratio of water to glycerin).

Left: Probe bottle with temperature probe. Right: Access port on rear of refrigerator.

3.3.1 Fill Temperature Probe Bottle

NOTICE Temperature probes are fragile; handle with care.

1. Remove all probes from bottle and remove bottle from bracket.
2. Remove cap and fill with approximately 4 oz. (120 mL) of product simulation solution.
3. Install cap and place bottle in bracket.
4. Replace probes, immersing at least 2” (50 mm) in solution.

3.3.2 Install Additional Probe Through Rear Port

1. Peel back putty to expose port.
2. Insert probe through port into chamber.
3. Insert probe into bottle.
4. Replace putty, ensuring a tight seal.

3.4 Chart Recorder

If installed, refer to the Temperature Chart Recorder Operation and Service Manual on CD.

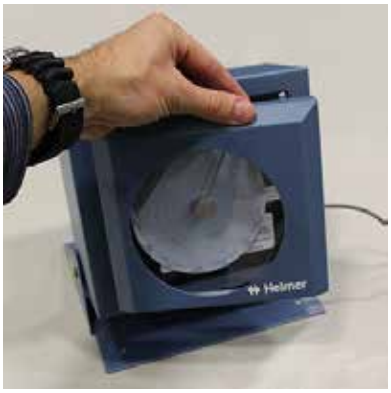
The chart recorder has a battery system, enabling a period of continuous operation if power is lost. Battery life varies by manufacturer as well as voltage level remaining. Providing full power is available, backup power for the temperature chart recorder is available for up to 14 hours.

Prior to use:

► Connect the chart recorder to AC power.
► Install battery.
► Add paper.
► Install the chart recorder probe in the probe bottle, through the rear port.
► Calibrate chart recorder to match chamber temperature.

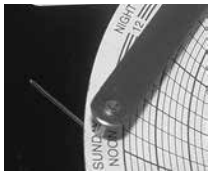
3.4.1 Chart Recorder Access

Open door by pulling door open.



3.4.2 Install Chart Paper

1. Press and hold **C** button. When stylus begins to move left, release button. The LED flashes to indicate current temperature range.
2. When stylus stops moving, remove chart knob then move knob up and away.
3. Place chart paper on chart recorder.
4. Gently lift stylus and rotate paper so current time line corresponds to time line groove.



5. Hold chart paper and reinstall chart knob.

NOTE For accurate temperature reading, ensure that current time is aligned with time line groove when chart knob is tightened.

6. Confirm temperature range is set to the correct value.
7. Press and hold **C** button. When stylus begins to move right, release button.
8. Confirm stylus is marking temperature correctly.

4 Compliance

4.1 Regulatory Compliance

Pollution degree: 2 (for use in USA and Canada only)

This product is certified to applicable UL and CSA standards by a NRTL.

Sound level is less than 70 dB(A).

4.2 WEEE Compliance

The WEEE (waste electrical and electronic equipment) symbol (right) indicates compliance with European Union Directive WEEE 2002/96/EC and applicable provisions. The directive sets requirements for labeling and disposal of certain products in affected countries.

When disposing of this product in countries affected by this directive:

- ► Do not dispose of this product as unsorted municipal waste.
- ► Collect this product separately.
- ► Use collection and return systems available locally.

For more information on the return, recovery, or recycling of this product, contact your local distributor.

5 Warranty

5.1 Rel.i™ Product Warranty USA and Canada

For technical service needs, please contact Helmer at 800-743-5637 or www.helmerinc.com. Have the model and serial number available when calling.

5.1.1 Rapid Resolution

When a warranty issue arises it is our desire to respond quickly and appropriately. The service department at Helmer is there for you. Helmer will oversee the handling of your warranty service from start to finish. Therefore, Helmer must give advance authorization for all service calls and/or parts needs relating to a warranty issue. Any repeat service calls must also be authorized as well. This allows for proper diagnosis and action. Helmer will not be responsible for charges incurred for service calls made by third parties prior to authorization from Helmer. Helmer retains the right to replace any product in lieu of servicing it in the field.

5.1.2 Compressor

For the warranty period listed below, Helmer will supply the refrigeration compressor, if it is determined to be defective, at no charge, including freight. Helmer will not be liable for installation, refrigerant, or miscellaneous charges required to install the compressor beyond the first year of the warranty period.

- ► Scientific Series model compressor warranty period is five (5) years.

5.1.3 Parts

For a period of two (2) years, Helmer will supply at no charge, including freight, any part that fails due to defects in material or workmanship under normal use, with the exception of expendable items. Expendable items such as glass, filters, light bulbs, and door gaskets are excluded from this warranty coverage. Inspection of defective parts by Helmer will be final in determining warranty status. Warranty procedures must be followed in all events.

5.1.4 Labor

For a period of one (1) year, Helmer will cover repair labor costs (including travel) and the cost of refrigerant and supplies necessary to perform authorized repairs. Repair service must be performed by an authorized Helmer service agency following the authorization process detailed above. Alternatively, your facility's staff may work with a Helmer technician to make repairs. Labor costs for repairs made by unauthorized service personnel, or without the assistance of a Helmer technician, will be the responsibility of the end user.

5.1.5 Additional Warranty Information

The time periods set forth above begin two (2) weeks after the original date of shipment from Helmer. Warranty procedures set forth above must be followed in all events.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY.

THE LIABILITY, IF ANY, OF HELMER FOR DIRECT DAMAGES WHETHER ARISING FROM A BREACH OF ANY SALES AGREEMENT, BREACH OF WARRANTY, NEGLIGENCE, OR INDEMNITY, STRICT LIABILITY OR OTHER TORT, OR OTHERWISE WITH RESPECT TO THE GOODS OR ANY SERVICES IS LIMITED TO AN AMOUNT NOT TO EXCEED THE PRICE OF THE PARTICULAR GOODS OR SERVICES GIVING RISE TO THE LIABILITY. IN NO EVENT SHALL HELMER BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION DAMAGES RELATED TO LOST REVENUES OR PROFITS, OR LOSS OF PRODUCTS.

This warranty does not cover damages caused in transit, during installation by accident, misuse, fire, flood, or acts of God. Further, this warranty will not be valid if Helmer determines that the failure was caused by a lack of performing recommended equipment maintenance (per Helmer manual) or by using the product in a manner other than for its intended use. Installation and calibration are not covered under this warranty agreement.

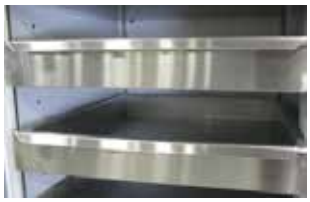
5.2 Outside of USA and Canada

Consult your local distributor for warranty information.

Section II: Scientific Series™ Models

6 Product Configuration

6.1 Move Shelves, Drawers, and Baskets


Storage features.

CAUTION

- ► Keep hands away from pinch points when closing the door.
- ► Before moving drawers, ensure they are completely empty for safe lifting.
- ► Maximum basket, drawer, or shelf load is 100 lbs (46 kg).

NOTICE Before moving storage components, protect stored items in refrigerator from extended exposure to adverse temperature.

Remove a shelf:

1. With one hand, lift front edge of the shelf from the front brackets.
2. With the other hand, reach under the shelf and bump rear edge of the shelf upward to disengage rear brackets.

Install a shelf:

1. Insert shelf into chamber, placing it on brackets.
2. Gently bump rear edge of the shelf downward to engage brackets.
3. Pulling shelf forward gently; shelf should not disengage from rear brackets.

Remove a drawer or basket:

1. Pull drawer or basket out until it stops.
2. On the right rail, locate the release tab and press downward.
3. While holding the right release tab downward, locate the release tab on the left rail and press upward.
4. Pull drawer or basket free of the slides.

Install a drawer or basket:

1. Align end guides on drawer or basket with the slides.
2. Gently push drawer or basket into chamber until it stops.
3. Pull drawer or basket out until it stops; check for smooth operation.

6.2 Move Brackets and Slides

Remove shelf brackets:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove front brackets from standards.

Install shelf brackets:

1. Insert front brackets into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

Remove drawer slides:

1. Using a screwdriver, remove front bracket retainers.
2. Tap front brackets upward to disengage standards.
3. Remove slides from standards.

Install drawer slides:

1. Insert slides into standard at appropriate height.
2. Tap front brackets downward to engage standards.
3. Using a screwdriver, install front bracket retainers.

6.3 Level the Refrigerator

NOTE

- ► Leveling feet are optional.
- ► Helmer recommends the use of leveling feet.
- ► A bubble level may be used to ensure the refrigerator is level.

Leveling feet must be adjusted to provide unit cooler drainage.

Front-to-back:

1. Rotate the leveling feet to raise or lower leveling feet.
2. When refrigerator is properly leveled, bottom of the unit cooler will slope downward from front to back (toward the condensate drain line).

Side-to-side:

1. Rotate the leveling feet to raise or lower leveling feet.
2. When refrigerator is properly leveled, bottom of the unit cooler will be horizontal (parallel to the floor).

6.4 Reverse Door Hinge and Handle

NOTICE Before reversing door hinge and handle, protect stored items in refrigerator from extended exposure to adverse temperature.

NOTE Refrigerator must be on the floor or on an elevated work surface with enough space in front of the refrigerator to lay the door face-down for disassembly.

6.4.1 Remove the Door and Hinges

1 Switch AC ON/OFF switch **OFF**.

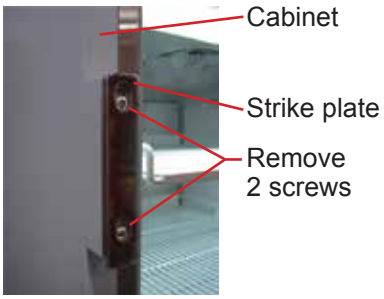
2 Remove the door handle assembly.

- **a** Remove two screws holding the door handle assembly on the door.
- **b** Set the door handle assembly aside.

Door handle assembly.

3 Remove door latch.

- **a** Remove two screws holding the door latch plates and spacer bar on the cabinet.
- **b** Set the latch plates and spacer bar aside.



Door latch plates.

4 With the door shut, remove the cover plate from both hinges.

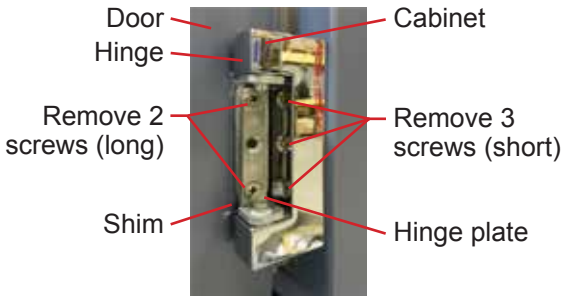
5 Remove the spring assembly from the lower hinge.
- **a** Use a J-hook tool to engage the left-most hole in the spring cap and rotate the spring cap from *left to right,* and hold.
- **b** Remove the pin from the spring cap.
- **c** Allow the spring to relax.
- **d** Use a J-hook tool to engage any hole in the spring cap and compress spring downward.
- **e** Remove spring assembly from the lower hinge.
- **f** Set the spring assembly aside.

NOTICE A second person should assist by supporting the door while the hinges are removed.

NOTE The two screws holding the hinge on the door are longer than the three screws holding the hinge on the cabinet. The screws must be installed in the same location when moving the hinge to the opposite side of the door.

6 Remove the lower hinge.
- **a** Support the door.
- **b** Remove five screws attaching the lower hinge to the door and cabinet.
- **c** Remove the lower hinge.
- **d** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **e** Set the lower hinge aside.
- **f** Continue to support the door.

7 Remove the upper hinge.
- **a** Remove five screws attaching the upper hinge to the door and cabinet.
- **b** Remove the upper hinge.
- **c** Reverse the hinge manually (as if moving the hinge from a fully-closed to a fully-open position).
- **d** Set the upper hinge aside.



Hinge removal (lower hinge shown with spring removed).

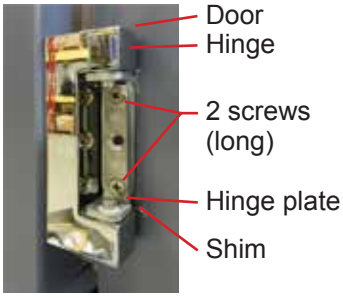
12 Remove the door and set it aside.

6.4.2 Reinstall the Door and Hinges

1 Install the hinges and hinge plates on the door.

- **a** Hand-thread two screws through each hinge and into the door.
- **b** Leave the screws slightly loose.
- **c** If a shim was used on the lower hinge, transfer the shim to the new hinge location.

NOTE Ensure that the upper and lower hinges are not interchanged when moving the hinges to the opposite side of the door.

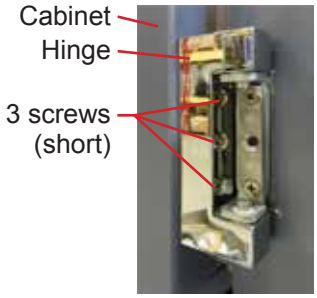


Attach hinge to door (lower hinge shown).

NOTICE A second person should assist by supporting the door while the hinges are installed.

2 Install the door on the cabinet.

- **a** Lift the door to the cabinet.
- **b** Align the holes in the hinges with the corresponding holes in the cabinet.
- **c** Hand-thread three screws through each hinge and into the cabinet.
- **d** Do not allow the weight of the door to rest on the hinges.



Attach hinge to cabinet (lower hinge shown).

3 Align the door and tighten screws.

- **a** Support the door so the top edge of the door is level.
- **b** Level the door using a shim if necessary.
- **c** Tighten all screws attaching both hinges to the door and to the cabinet.

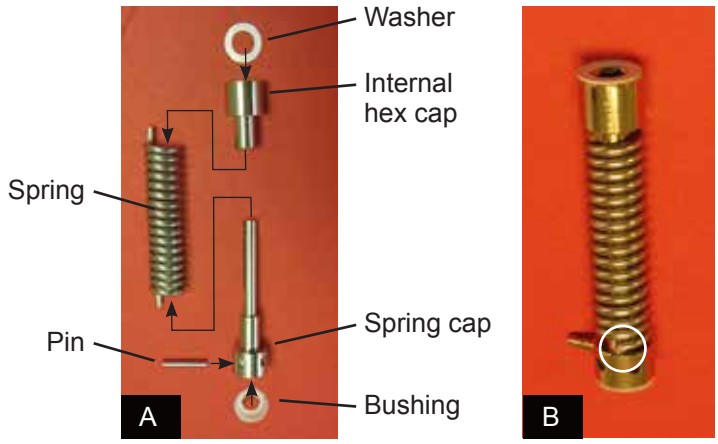
NOTE If a shim is necessary to level the door after hinge reversal, contact Helmer Technical Service to obtain a shim.

4 Install the door handle on the opposite side of the door.

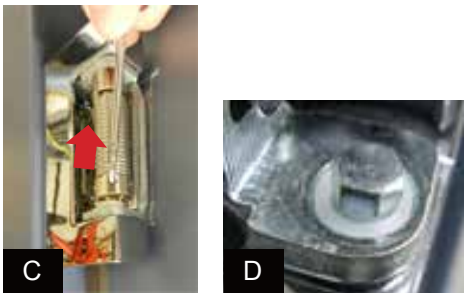
5 Install the latch plates and spacer bar on the opposite side of the cabinet.

6 Install the hinge spring and pin assembly.

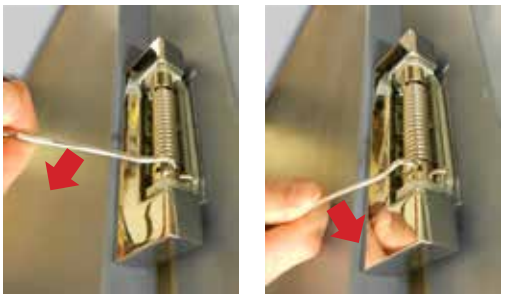
- **a** Close the door.
- **b** Assemble the hinge spring assembly for the left side of the door *(Figure A)*.
- **c** Orient the bend in the coil toward the front of the refrigerator *(Figure B)*.
- **d** Slide the internal hex cap (with washer) on to the upper hex bolt in the lower hinge.



- **e** Use a J-hook tool in the spring cap to compress the spring upward *(Figure C)*.
- **f** While compressing the spring, slide the spring cap over the lower hex bolt in the lower hinge *(Figure D)*.



- **g** Use a J-hook tool to engage the right-most hole in the spring cap and rotate the spring cap from *right to left,* and hold.
- **h** Count four holes, starting from and including the spring cap hole closest to the end of the coil.
- **i** Insert the pin in the fourth hole.



Rotate the spring using a J-hook tool then insert pin (left-hinged door shown).

7 Switch AC ON/OFF switch **ON**.

8 Verify the door is level and the hinges operate smoothly and the door seals tightly.

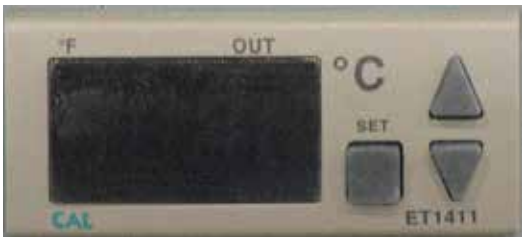
6.5 Stacked Undercounter Units

WARNING

- For a stacked configuration, both units must have leveling feet installed.
- The back brace bars and front stabilizing brackets must be installed.
- When stacking a refrigerator and freezer (104 and/or 105 models), place the heavier unit on the bottom.
- Do not open multiple, loaded drawers or baskets at the same time.

Call Helmer or your distributor for more information on the stacking kit, and for methods to secure both units to the wall and/or the floor.

7 Temperature Controller Setpoints



Temperature monitor and controller.

Temperature controller setpoints are programmed at the factory. Setpoints can be viewed and changed through the temperature controller. Parameter values reside in three program levels.

Parameters are grouped into three levels:

- Operational (1)
- Control (2)
- Security (3)

NOTICE Changing parameter values affects refrigerator operation. Do not change parameter values unless instructed in product documentation or by Helmer Technical Service.

NOTE

- To change the value for a parameter, first enter the program mode for that level.
- When there is no interaction for 25 seconds, the temperature controller exits program mode and returns to normal mode.

View or change parameter values:

1. Enter program mode:
   - **a** Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately three seconds.
   - **b** The temperature controller is now in program mode.
2. Select the parameter to be changed:
   - **a** Press and release the **UP** or **DOWN** arrow buttons until the desired program level flashes on the display.
3. Change a parameter value:
   - **a** Press and release the **DOWN** arrow button until the desired parameter flashes on the display.
   - **b** Press and hold the **SET** button.
   - **c** While holding the **SET** button, press the **UP** or **DOWN** arrow buttons to change the value.
4. Release all buttons to exit the parameter. New settings are saved.

5 Repeat steps 2 through 4 to access another program level, or to view or change parameter values in the selected level.

6 Exit program mode:

a Press and hold the **UP** and **DOWN** arrow buttons simultaneously for approximately one second.

b The current chamber temperature is displayed.

7.1 Operational (Level 1) Parameters and Values (OU)

NOTE

- ► Parameters are listed in order of appearance.
- ► The temperature controller is programmed at the factory to yield a refrigerator setpoint of 3.4 °C.

Parameter	Description	Default Value
o.LOL	Lower Limit of the setpoint	0.0
o.UPL	Upper limit of the setpoint	20.0
o.OFF	Offset value for the refrigerator	Varies (1)
o.HYS	Hysteresis value (2)	1.2
o.PPn	Run time for compressor in the event of a probe failure	2.0
o.PPF	Off time	20.0

(1) Increase value to lower chamber temperature. Reduce value to raise chamber temperature.

(2) Hysteresis for older refrigerators may be different than the value listed in this table. The refrigerator will operate correctly with the original hysteresis value, or with the hysteresis value listed in this table.

7.2 Control (Level 2) Parameters and Values (Cn)

Parameter Identification	Description	Default Value
c.tYP	Heat or cool	COOL
Unit	Fahrenheit or Celsius	ºC
drES	Display resolution	YES

7.3 Security (Level 3) Parameters and Values (SE)

Parameter Identification	Description	Default Value
S.COd	Access code for security	0

7.4 Error Codes

Code	Description
PSC	Unit cooler probe is short-circuited
PFA	Unit cooler probe is malfunctioning
- - - -	Chamber temperature is higher than the scale
- - - -	Chamber temperature is lower than the scale

7.5 Change the Refrigerator Setpoint

NOTE

- ► Default setpoint is 3.4 °C.
- ► Setpoint for older refrigerators may be different than the value listed above. The refrigerator will operate correctly with the original setpoint value, or with the setpoint value listed above.
- ► When there is no interaction for 25 seconds, the temperature controller exits program mode and returns to normal mode.

Change the setpoint:

1. On the temperature controller, press and hold the **SET** button.
2. While holding the **SET** button, press the **UP** or **DOWN** arrow buttons to change the temperature setpoint.
3. Release all buttons. The temperature setpoint is changed.

EXAMPLE

- ► Current setpoint is 3.4 °C
- ► Target setpoint is 4.0 °C
- ► Setpoint adjustment value is +0.6 °C

7.6 Change the Control Sensor Offset

The temperature controller senses chamber temperature through a probe in the unit cooler. The chamber setpoint typically varies from the measured temperature, so an offset value is used by the control system to compensate for the difference.

- ► Value is factory-preset and varies for each unit
- ► Offset value can be changed from -10.0 °C to +10.0 °C

NOTICE Control sensor offset is factory-preset and should not be changed unless directed by Helmer Technical Service.

NOTE If the variance is within acceptable limits for your organization, changing the offset value is optional.

7.7 Change the Hysteresis Value

NOTE

- ► Default is 1.2 ºC.
- ► Hysteresis value for older refrigerators may be different than the value listed above. The refrigerator will operate correctly with the original hysteresis value, or with the hysteresis value listed above.
- ► Allowable temperature variance above the refrigerator setpoint.
- ► Parameter values are factory-preset and should not be changed unless directed by Helmer Technical Service.
- ► When there is no interaction for 25 seconds, the temperature controller exits program mode and returns to normal mode.

NOTICE Hysteresis is factory-preset and should not be changed unless directed by Helmer Technical Service.

8 Maintenance

NOTICE

- ► Before performing maintenance, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after performing service or after extended door opening.

NOTE Refer to the operation manual for the preventive maintenance schedule.

8.1 Recharge Refrigerant

CAUTION

- ► Review all safety instructions prior to recharging refrigerant. Refer to chapter **2** (Safety).
- ► Maintenance should only be performed by trained refrigeration technicians.

NOTICE Use only non-CFC R-134A refrigerant.

Full initial refrigerant charge varies by model and power requirements, which can be found on the product specification label.

Model	Power Requirements	Initial Charge
SLR104-ADA	115 V	4.5 oz. (128 g)

Obtain:

- ► Refrigerant
- ► Calibrated pressure gauge (0 lbs/in² to 25 lbs/in² (0 kPa to 175 kPa))

Add refrigerant:

1 Attach pressure gauge to the fittings on the refrigeration lines.
2 Monitor the low side (suction) pressure through a full compressor cycle.
3 Measure the pressure at the end of the next cycle, immediately before the compressor stops.

NOTE Pressure varies depending on ambient air temperature.

4 Add refrigerant so the low side pressure is within acceptable range (12 lbs/in² to 14 lbs/in² (83 kPa to 97 kPa)).
5 Remove pressure gauge.

8.3 Clean the Refrigerator

8.3.1 Condenser Grill

In environments where refrigerator is exposed to excessive lint or dust, condenser grill may require cleaning more frequently than stated in preventive maintenance schedule.

Clean the condenser grill using a soft brush and a vacuum cleaner.

8.3.2 Exterior

Clean glass surfaces with soft cotton cloth and glass cleaner. Clean exterior surfaces with soft cotton cloth and non-abrasive liquid cleaner.

8.3.3 Interior

Clean painted surfaces with mild detergent. Clean stainless steel surfaces with a general-purpose laboratory cleaner suitable for stainless steel.

8.3.4 Door Gaskets

Clean with soft cloth and mild soap and water solution.

8.3.5 Clean and Refill Probe Bottle (optional)

NOTE A kit that includes a probe bottle and glycerin is available from Helmer.

Obtain:

- Fresh water-bleach solution (not provided)
  - 1:9 ratio of bleach to water
  - Bleach is 5% solution of commercial sodium hypochlorite (NaOCl)
  - Equivalent oxidizing cleaner/disinfectant approved by your organization may be substituted
- 4 oz. (120 mL) of product simulation solution per bottle
  - 10:1 ratio of water to glycerin

Clean and refill bottle:

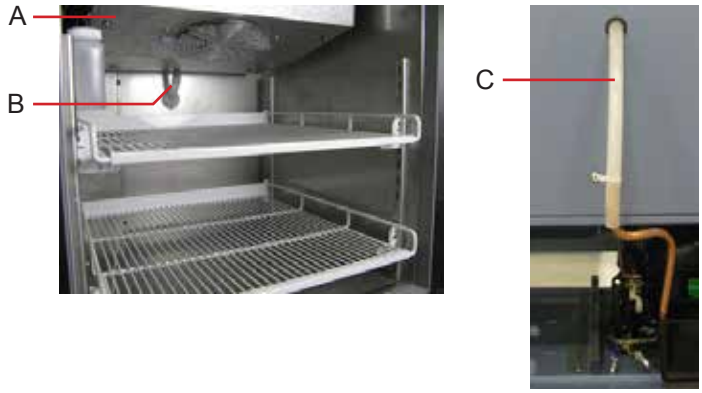
1. Remove probe from bottle.
2. Remove bottle from bracket.
3. Clean bottle with water-bleach solution.
4. Fill bottle with 4 oz. (120 mL) of product simulation solution.
5. Cap bottle tightly to minimize evaporation.
6. Place bottle in bracket.
7. Replace probe, immersing at least 2” (50 mm).

8.4 Unit Cooler Cover Removal and Installation

If unit cooler cover is not removed as detailed in this procedure the drain port may be damaged. Improper drainage may result in excessive icing and refrigerator’s inability to maintain temperature.

Required tools:

- 5/16” socket wrench
- Tool to push putty away from the drain hose



Drain line and hose.

Label	Description
A	Unit cooler cover
B	Drain port
C	Drain hose

8.4.1 Remove the Unit Cooler Cover

WARNING Disconnect the refrigerator from AC power when removing the unit cooler.

1. Switch AC ON/OFF switch **OFF**.
2. On the back of the cabinet, peel the putty back to expose the drain hose (C).
3. Remove top shelf, drawer, or basket from the chamber.
4. Remove drain hose from unit cooler drain port (B).
   a. Pull drain hose downward to separate from unit cooler.
   b. Twist drain hose while pulling to assist in removal.
5. Push the drain hose (C) out through rear of chamber.
6. Remove the unit cooler cover.
   a. Hold unit cooler cover in place to prevent it from dropping.
   b. Use the socket wrench to remove four screws securing the unit cooler cover.
   c. Carefully lower unit cooler cover to avoid damage to the fan wiring.

8.4.2 Install the Unit Cooler Cover

1. Verify unit cooler wiring is connected and routed correctly.
   a. Wiring should be routed above copper tube inside the unit cooler.
   b. Reconnect wires if they have separated.
2. Attach unit cooler cover.
   a. Lift unit cooler cover into place.
   b. Front edge of the cover should be behind the unit cooler case.
   c. Use the socket wrench to install 4 screws to secure the unit cooler cover.
3. Insert the drain hose through hole in the refrigerator.
   a. Push drain hose upward, toward the unit cooler drain port.
   b. In the chamber, push drain hose onto unit cooler drain port.
4. Reinstall top shelf, drawer, or basket if previously removed.
5. On the back of the cabinet, press putty around the drain hose.
6. Switch AC ON/OFF switch **ON**.

8.5 Supplies

Refrigerant: non-CFC, R-134A

Glycerin solution: 400922-1

Chart paper: 220366 (52 sheets)

Chart recorder backup battery: (1) 9 V non-rechargeable alkaline (or equivalent)

9 Troubleshooting

CAUTION
- ► Review all safety instructions prior to troubleshooting. Refer to chapter **2** (Safety).
- ► Troubleshooting should only be performed by trained refrigeration technicians.

9.1 General Operation Problems

Problem	Possible Cause	Action
A drawer or basket does not slide easily.	Debris in the drawer slides.	► Pull the drawer or basket out and confirm the slides are free of debris. Clean if necessary.
	Drawer slides are not lubricated.	► Using a lightweight oil, lubricate the bearings in the slides.
	Drawer or basket is misaligned or not level.	► Confirm both slides for the drawer or basket are mounted at the same height.
	Drawer slide is faulty.	► Confirm the slide is operating correctly. Replace if necessary.
Door does not open easily.	Debris in the hinges.	► Confirm the hinges are free of debris. Clean the hinges if necessary.
	Hinge is faulty.	► Confirm the hinge spring or pin is not damaged. Replace entire hinge (lower hinge only), if necessary.
	Lower hinge spring and/or pin may be bent or faulty.	► Replace the entire lower hinge spring and pin assembly.

9.2 Chamber Temperature Problems

Problem	Possible Cause	Action
Compressor runs continuously.	Refrigerator setpoint is set too low.	► Confirm the setpoint is set within the operating range and change it if necessary.
	Temperature control probe in the unit cooler is faulty.	► Confirm the unit cooler probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Temperature controller is faulty.	► Confirm the temperature controller is operating correctly. Replace it if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.

Problem	Possible Cause	Action
Chamber temperature does not stabilize at the refrigerator setpoint.	Temperature controller is faulty.	► Confirm the temperature controller is operating correctly. Replace the controller if necessary.
	Compressor starting relay is faulty.	► Confirm the relay is operating correctly. Replace the relay if necessary.
	Condensing unit fan is not running.	► Check the condensing unit fan connections. Replace the fan motor if necessary.
	Unit cooler fan is not running.	► Check the voltage to the fan when door switch is activated. Replace the fan motor or door switch if necessary.
	Compressor motor has seized.	► Replace the compressor.
	Temperature control probe is out of calibration.	► Contact Helmer Technical Service.
	Temperature control probe in the unit cooler is faulty.	► Confirm the probe is providing resistance in the range of 98 Ω to 110 Ω. Replace the probe if necessary.
	Refrigerant level is too low.	► Check the refrigeration lines for leaks and repair them if necessary. Check the refrigerant level. Recharge the refrigerant if necessary.
	Condenser grill is dirty.	► Check the condenser grill. Clean the grill if necessary.
	Air circulation at the top of the chamber is inadequate.	► Check if there are any items that may obstruct air flow and remove them if necessary.
	Ambient air temperature around the refrigerator is too high.	► Confirm the refrigerator is placed appropriately.
	A component is faulty or internal connections are loose.	► Contact Helmer Technical Service.

9.3 Condensation Problems

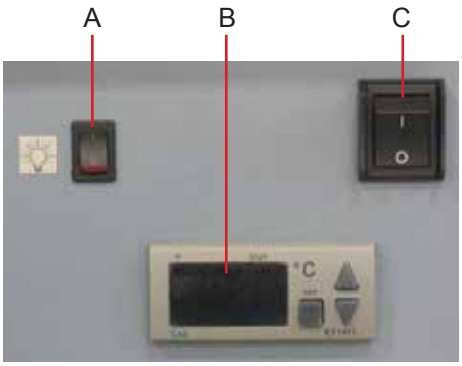
Problem	Possible Cause	Action
Excessive water in the water evaporation tray.	Humid air is entering the chamber	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
Excessive water in the chamber.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Connection between the unit cooler and the drain tube is loose.	► Confirm the connection is secure. Tighten the connection if necessary.
	Drain line is plugged.	► Confirm the drain tube is free of debris. Remove debris if necessary.
Water leaks from the bottom of the refrigerator.	Humid air is entering the chamber.	► Confirm the refrigerator is level, and the door is aligned, closing tightly, and sealing correctly.
	Excessive water in the evaporation tray.	► Contact Helmer Technical Service.

10 Parts

NOTICE

- ► Before replacing parts, protect items in refrigerator from extended exposure to adverse temperature.
- ► Allow refrigerator temperature to stabilize at setpoint after replacing parts or after extended door opening.

10.1 Front

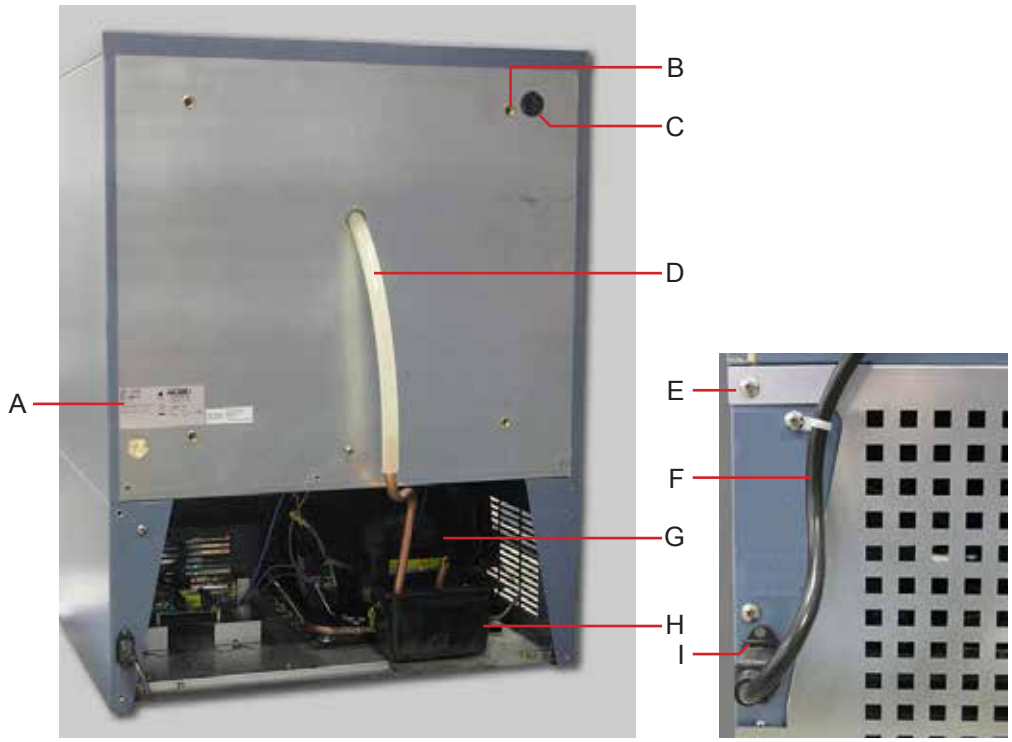


Lower panel features.

Label	Description	Part Number	Schematic Label
A	Light switch (optional)	120202	AY
B	Temperature controller	400835-1	B
C	Main power switch	120478	Q

NOTE The chamber light is optional on Scientific Series refrigerators.

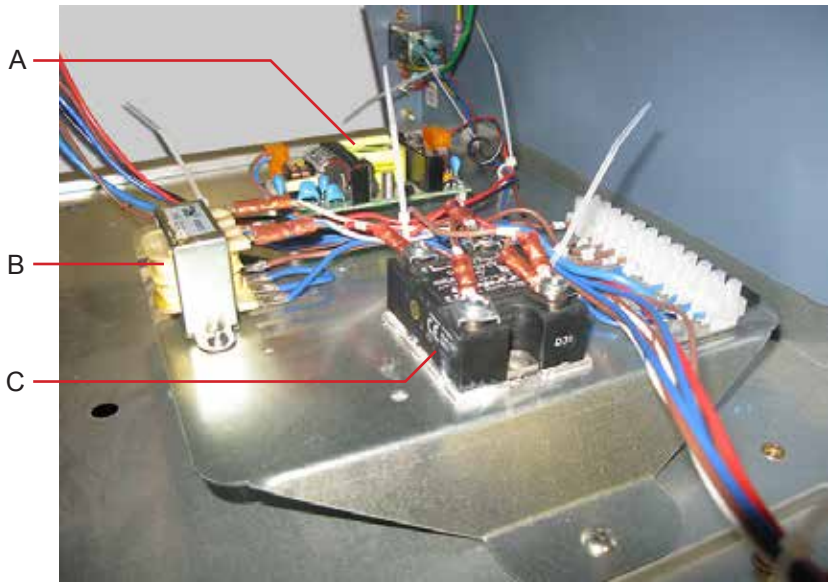
10.2 Rear



Rear features.

Label	Description	Part Number	Schematic Label
A	Product specification label	-	-
B	Insert for stacking bracket	-	-
C	Access port	-	-
D	Drain line	321190-1	-
E	Rear panel	321184-1	-
F	Power cord	120630	-
G	Compressor	800129-1	A
H	Condensate evaporator	-	-
I	Power connector	-	-
Not shown	Condenser fan motor	120608	U
	Caster (optional, swivel with brake)	220380	-

10.3 Electrical Tray Components



Electrical tray features.

CAUTION Disconnect the refrigerator from AC power before accessing the electrical tray.

Label	Description	Part Number	Schematic Label
A	12 V DC power supply for optional cabinet lighting	400836-1	AH
B	Temperature control transformer	401097-1	AI
C	Compressor relay	400841-1	AD

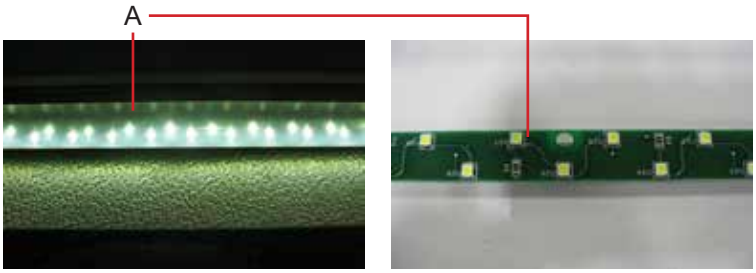
10.4 Interior

Interior features.

Label	Description	Part Number	Schematic Label
A	Door	**Solid door** Powder coated: 401137-1 Stainless steel: 401137-2 **Glass door (optional)** Powder coated: 401138-1 Stainless steel: 401138-2	-
B	Door switch	120380	I
C	Shelf (standard)	-	-
D	Standard for adjusting storage components	321638-1	-
E	Slide for drawer or basket	400753-2	-
F	Roll-out basket (optional, includes slides and hardware)	401133-1	-
G	Drawer (optional, includes slides and hardware)	401081-1	-

10.4.1 Lighting

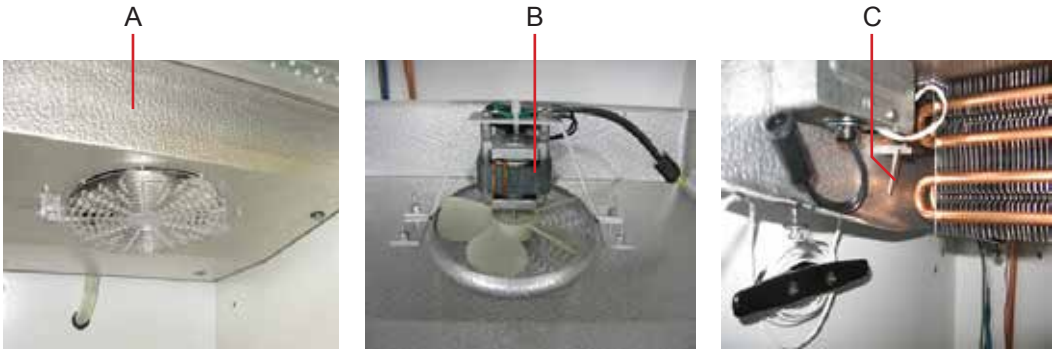
NOTE The chamber light is optional on Scientific Series refrigerators.



Light features (partial views).

Label	Description	Part Number	Schematic Label
A	Light assembly (includes circuit board and cover)	400804-1	AX
Not shown	Light cover	-	-

10.4.2 Unit Cooler



Unit cooler interior features.

Label	Description	Part Number	Schematic Label
A	Unit cooler assembly	800130-1	-
B	Unit cooler fan motor	120540	H
C	Temperature control probe	120579	M

10.5 Door and Hinge

Hinge, hinge spring and pin assembly, and door handle with key lock.

NOTE Spring tension is controlled at the point where the pin is stopped by the side plate (C, D).

Label	Description	Part Number
A	Hinge, covered, edge mount	220506
B	Hinge, uncovered, without spring assembly	-
C	Hinge, uncovered, spring and pin assembly	-
D	Close up, hinge spring and pin assembly	-
E	Door handle - Magnetic offset latch with key lock	-
F	Door key lock with key, close-up	-
Not shown	Door gasket (magnetic)	-
Not shown	Door lock replacement kit	-

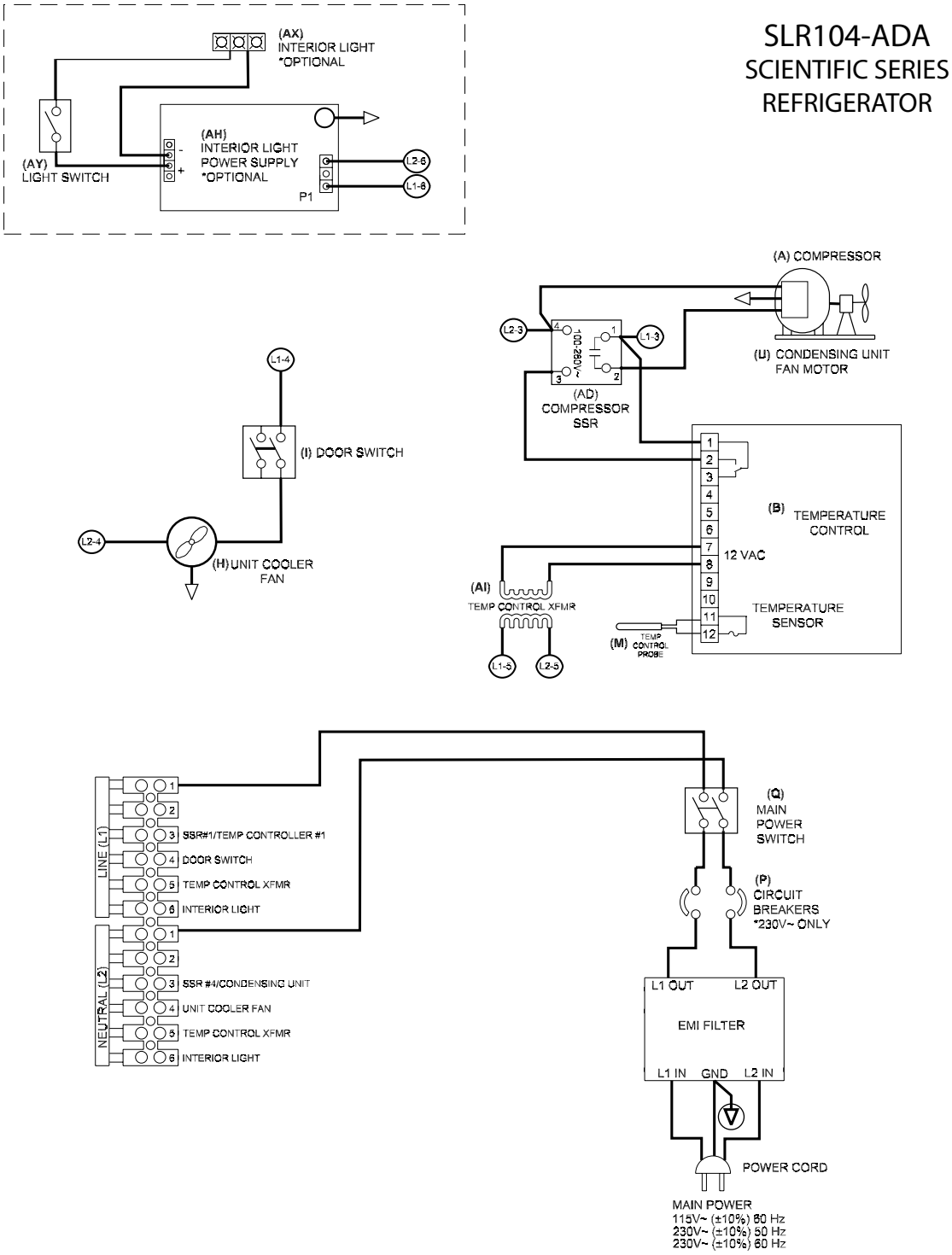
10.6 Side Access Panel

Undercounter refrigerators feature easy access for servicing, removal, and replacement of the compressor and condenser. The compressor is accessible from the rear and the side.

Side access panel.

11 Schematics

11.1 SLR model; 104 configuration



END OF MANUAL

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